

GCOS

TECHNICAL SUPPORT PROJECT PACIFIC



Port Moresby, Papua New Guinea, Station Number 92035 – Upper air sounding – Balloon release

QUARTERLY REPORT

JANUARY - MARCH 2005

**METEOROLOGICAL SERVICE OF
NEW ZEALAND LIMITED**

30 April 2005

1 Executive Summary

This is the third Quarterly report of the GCOS Technical Support Project – Pacific (TSP).

During the Quarter we extended TSP support to Port Moresby. Although initially planned as a technical survey visit, we were able to assist to re-commission the upper air programme after a robbery resulted in the upper air PC and printer being stolen. TSP funds purchased a printer locally and we used a discarded PC on site to replace the stolen unit. The survey was useful and enabled us to determine the extent of future support that would likely be needed. We also completed a full survey of the GUAN station at Honiara to determine what would be needed to restore this location. This proved to be less than we had expected with the existing GUAN station, which had not been used in some six years, being recoverable.

Reports on both surveys have essentially been completed and are awaiting some final information before being provided to the GCOS Secretariat. A précis is provided in this Q3 report.

Performance from Penrhyn and Funafuti remained very good in Q3. The performance from Tarawa has deteriorated. This is mainly as a result of communication issues. We are working to resolve these by way of a satellite / HF radio email system but it will be Q1 0506 before an alternative system can be installed. Termination heights at Penrhyn remain excellent – a result of changing to 700 gram balloons. A supply of these balloons has been received at MetService for Tarawa and Funafuti and these will be forwarded to the stations. Q1 0506 should see all three stations using these larger balloons.

Consistent with the Caribbean stations, we are experiencing power supply failures with the Proton Hogen 20 hydrogen generator that we installed at Funafuti. Two units have failed. We are holding a third unit but this will not be installed until we complete the TSP Routine Maintenance visit in Q4. We are also manufacturing a voltage control unit to protect the power supply from excessively high or low voltages, although we do not accept that local power fluctuations are at fault. We have left the old M28 generator operating and so no flights have been lost. No problems have been experienced at Tarawa or Penrhyn.

The GSN inspection kits have been despatched to Niue, Tonga and Tuvalu as the first countries to undertake inspections. CLIREP is not an easy programme to set up, and although we have provided advice and assistance remotely we believe that an in-country visit will be needed to commission it. The report makes some recommendations about that.

2 TSP Stations

The following stations are provided for under the TSP provisions.

Station Nr.	Station	Country	GSN	GUAN
91490	Christmas Is (Kiritimati)	Kiribati		
91610	Tarawa	Kiribati		
91701	Kanton	Kiribati		
91503	Munda	Solomon Islands		
91517	Honiara	Solomon Islands		Note 1
91554	Tekoa Airport, Santo	Vanuatu		
91568	Aneityum	Vanuatu		
91631	Nanumea	Tuvalu		
91643	Funafuti	Tuvalu		
91650	Rotuma	Fiji		
91652	Udu Point AWS	Fiji		
91680	Nadi	Fiji		
91699	Oni I Lau AWS	Fiji		
91724	Nukunonu	Tokelau Islands		
91780	Lupepau'u	Tonga		
91789	Nuku'alofa	Tonga		
91801	Penrhyn	Cook Islands		
91802	Penrhyn AWS	Cook Islands		
91812	Pukapuka AWS	Cook Islands		
91831	Aitutaki AWS	Cook Islands		
91843	Rarotonga	Cook Islands		
91824	Hanan Airport	Niue		
92014	Madang	Papua New Guinea		
92035	Port Moresby	Papua New Guinea		Note 1
92044	Momote	Papua New Guinea		
91960	Pitcairn Is	United Kingdom Territory		

Note 1: GUAN Survey for Honiara and minor review for Port Moresby were completed under a TSP Agreement extension – Q3.

3 GUAN Station Performance

3.1 Overview

During this Quarter we extended our support under the TSP to include some minor assistance for Port Moresby. For the other three stations supported under the TSP – Tarawa, Funafuti and Penrhyn, the routine operational expenditure is primarily provided by the Met Office, with some funding from WMO VCP for Penrhyn. We understand that WMO VCP has now withdrawn from future funding support and that GCOS is planning to take over the WMO VCP component. Current reserves in this component should be sufficient to cover the period until towards the end of 2005. MetService contributes some technical and administration support. The TSP enables the technical assistance already allowed for to be enhanced. As Rarotonga

may be of interest for future GUAN applications we have included monitoring for this station but excluded any commentary on performance.

3.2 Tarawa Upper Air Programme

Q3 was not a very satisfactory quarter for the programme. A total of 73 observations of a maximum possible of 90 were received. Five flights were not completed due to the supply of radiosondes running out in February. We had been relying on the missing radiosonde consignment which had been relocated in wharf storage and released for collection in mid December, after we negotiated a deal with the insurer, being uplifted during that six week period. We were advised by the station when two radiosondes remained and we air-freighted a supply. The missing radiosondes were finally collected in early April. A further 12 flights were not received because of communications problems. These were mainly because ISP issues but a few were a result of incorrect addressing and our system rejecting them as SPAM. While we would normally detect this when Garry Clarke checks the inward messages manually but on this occasion he was overseas. The Proton generator continued to operate well.

Please see next section for comments on communications improvements and balloons that are also applicable to Tarawa.

3.3 Funafuti Upper Air Programme

While we have seen an improvement in the communication problems identified in the Q2 report, the issue with the local provider remains. Communications again were the sole problem during Q3. To date, this is much more of an issue for operational deadlines as opposed to GCOS climatological ones. A total of 87 of 90 possible flights were received.

The Iridium Satellite/HF Radio digital email system that we are working on for Tarawa and Funafuti should resolve the communication problems. We have purchased some of the required components but the project outputs are more than a simple installation of “off the shelf” components. The economics of the system, when compared to the existing budget provisions, require that it remains dedicated to upper air and not a backup for every other email requirement when the local ISP is inoperative.

To avoid the exposure of the programme to significant communications costs should the system be used for other purposes, we are planning to purchase satellite time in blocks, to install the satellite telephone in a locked steel cabinet with the ability to view the screen and press key pads on the telephone via a viewing window and strategically placed drilled holes. We will also write software that restricts the email messaging to upper air messages.

At present Garry Clarke, who will undertake this work, is committed, mainly with the Tuvalu RANET project, and it will be early-mid June before we can resume work on this project.

We supplied a replacement for the failed component in the power supply and this was installed by the local technician early in Q3. The same component has failed again. We understand from Dick Thigpen that Caribbean stations have been having similar problems with Proton power supplies and it is unclear whether the failures are as a result of the mains power fluctuations or the component itself.

A voltage under/over protective device we are making will be supplied during a TSP scheduled visit in May. We will also repair the Proton and re-commission it once this device is in place. In the meantime, the programme continues using the old M28 system. We have had to supply some parts to keep this going as an interim measure.

700 gram balloons have now been received in New Zealand and will shortly be supplied to Funafuti and Tarawa to replace the 350 gram balloons presently in use.

3.4 Penrhyn Upper Air Programme

The Upper Air programme at Penrhyn continues to operate exceptionally well. During Q3 one flight was lost as a result of an electricity generator fault and one flight was not received at all because of a communications fault.

The radar continues to operate satisfactorily and there has been no requirement to use a GPS radiosonde. However, the lack of spare thyratrons on station is an issue we are addressing. The unit value is about NZD 1,500 and they fail periodically. The obsolete nature of radar means that current thyratrons do not fit and we are creating an adaptor. Two spares will be air freighted shortly. Our GCOS TSP resources are being used to fund the spares. We should note, though, that a failure of a major radar component is likely to result in a requirement to change to GPS radiosondes permanently.

Radiosonde soundings termination heights are generally very good with those that are terminated as a result of a “burst” usually reaching between 5 and 10 hPa.

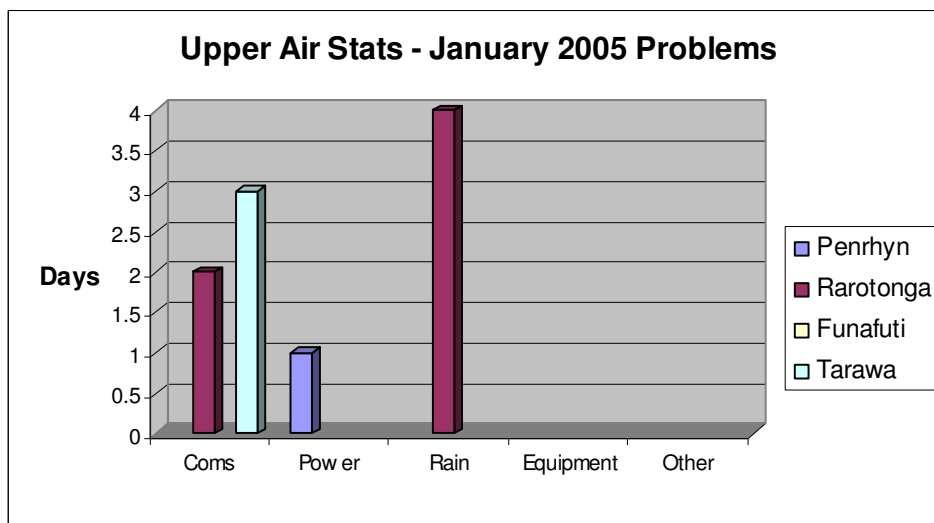
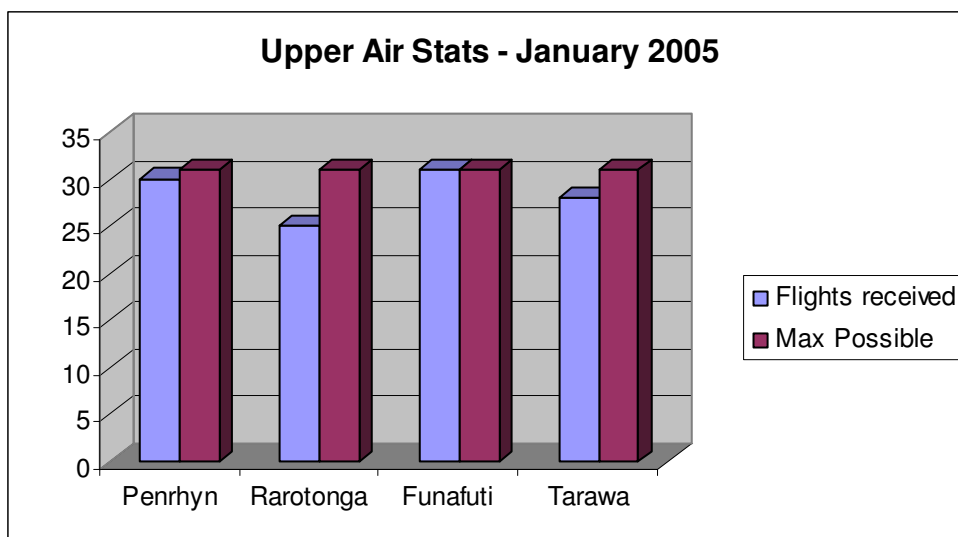
The draft MOU that Steve Palmer and Tony Veitch discussed with the Cook Islands continues to await a resolution of land lease matters by the Cook Island Investment Corporation. The remainder of the MOU is acceptable to the Cook Islands and therefore acknowledges the Parties expectations of each other even though it remains unexecuted.

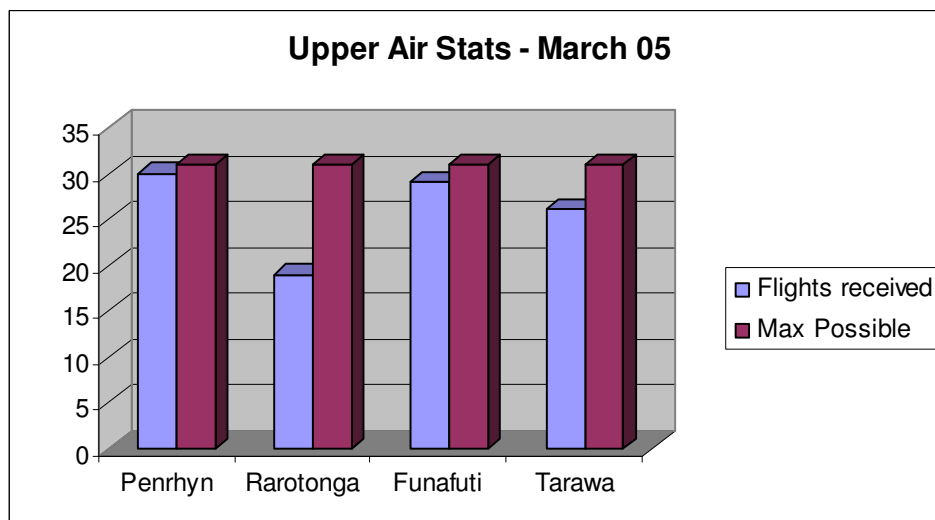
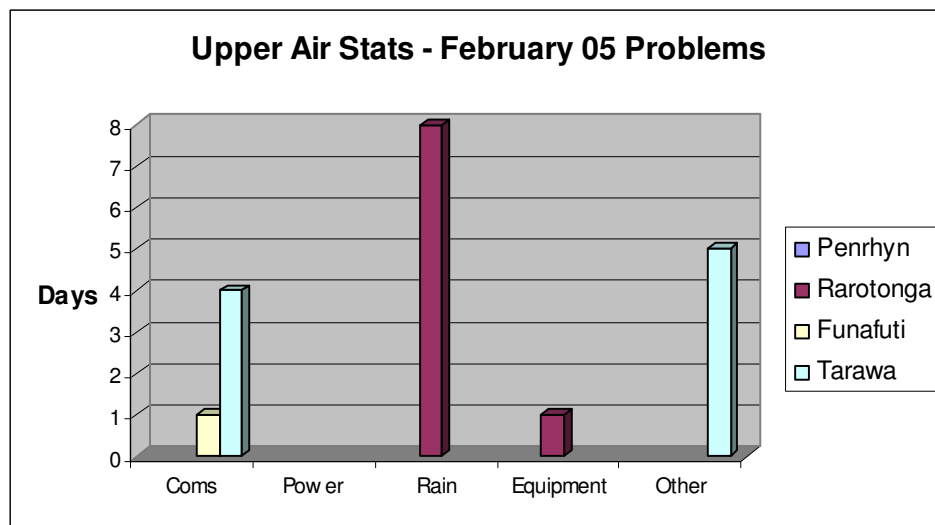
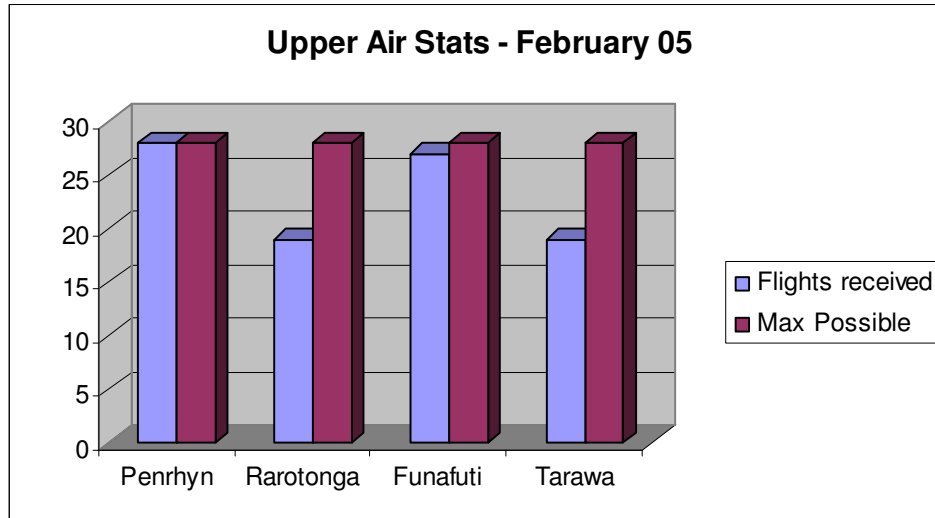
No issues were experienced with the Proton.

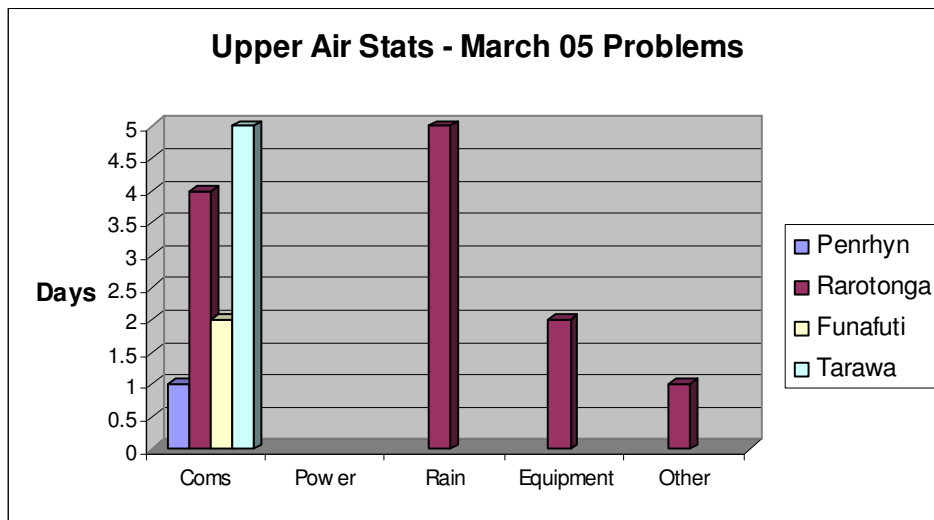
3.5 Upper Air Statistics

The charts are largely self-explanatory.

The “Problems” chart provides a breakdown of areas in which problems occurred at the stations. The "Other" category encompasses occasions when no information has been provided from the station and we have been unsuccessful in discovering the reason. It is also used for depleted stores. The “Rain” category applies to radar wind finding and signal loss due to strong rain echoes.





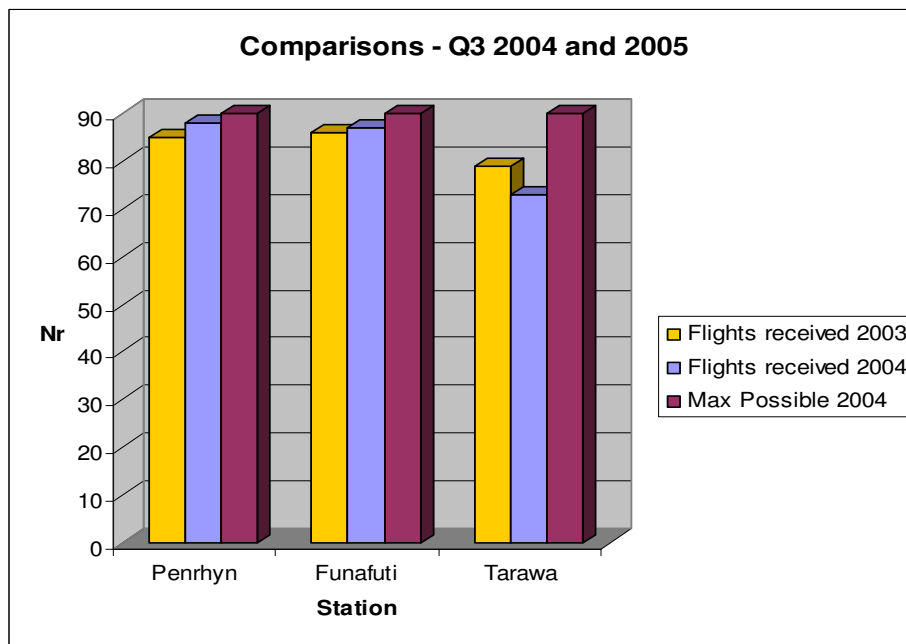


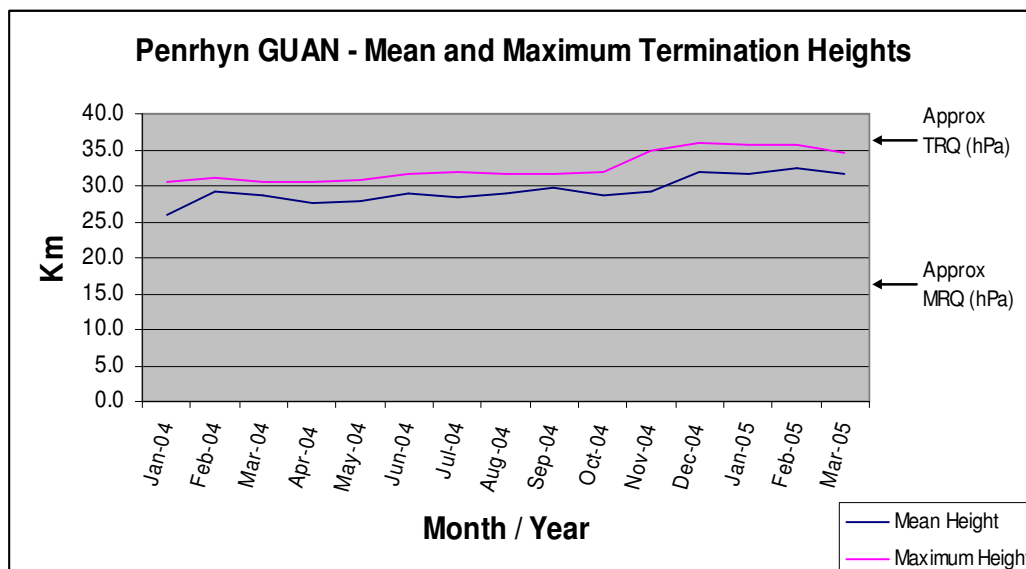
Note: Rarotonga is not currently a GUAN station and does not receive support under the TSP provisions.

3.6 Climate Temp Messages

Further to the re-establishment of Climate Temp messages at Tarawa and Funafuti in July 2004, we commenced providing these messages at Penrhyn from November 2004 when radiosonde was introduced.

3.7 Comparison of 2003 and 2004 Results





- Mean and Maximum Height data is not presently accessible for Tarawa, Funafuti and Port Moresby.
- GCOS GUAN – Target Requirement (TRQ) = 5 hPa;
Minimum Requirement (MRQ) = 100 hPa.

4 GSN Station Performance

4.1 Overview

Synoptic reports from GSN stations provide the input to enable the end of month Climate Message to be constructed for each station. Our focus to date has been on the GUAN programme – consistent with the GCOS priorities as we understand them.

We were hoping to add the monitoring of Papua New Guinea stations during Q3 but this is now planned for Q4.

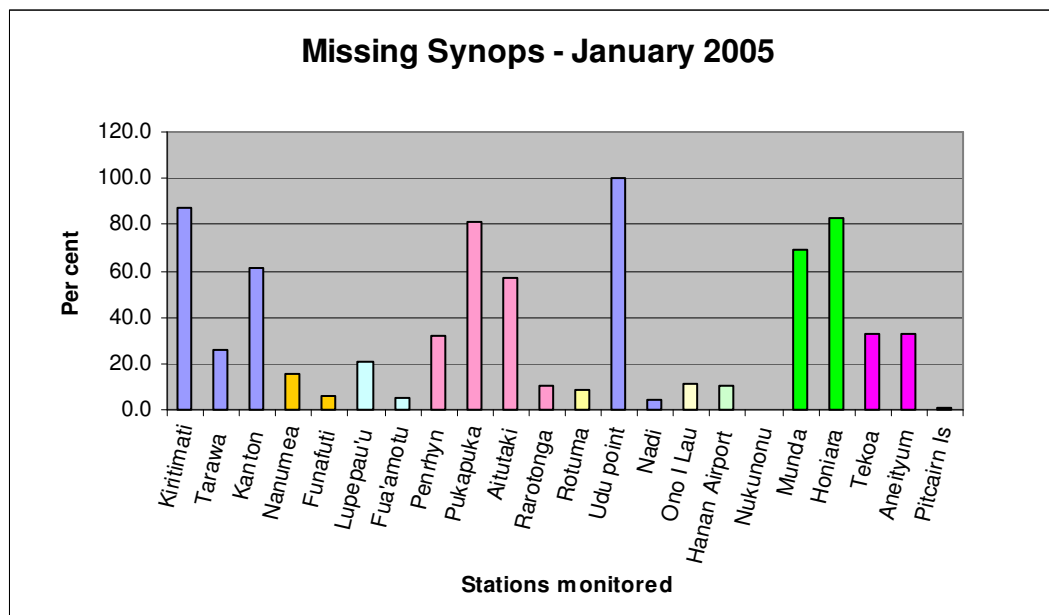
4.2 GSN Station – Missing Synoptic Reports

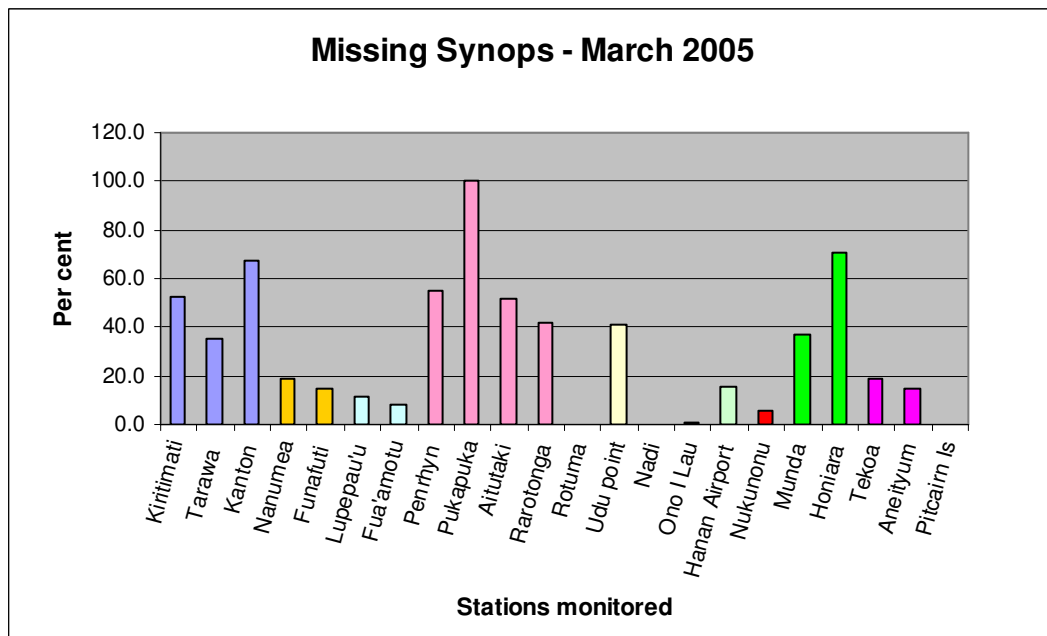
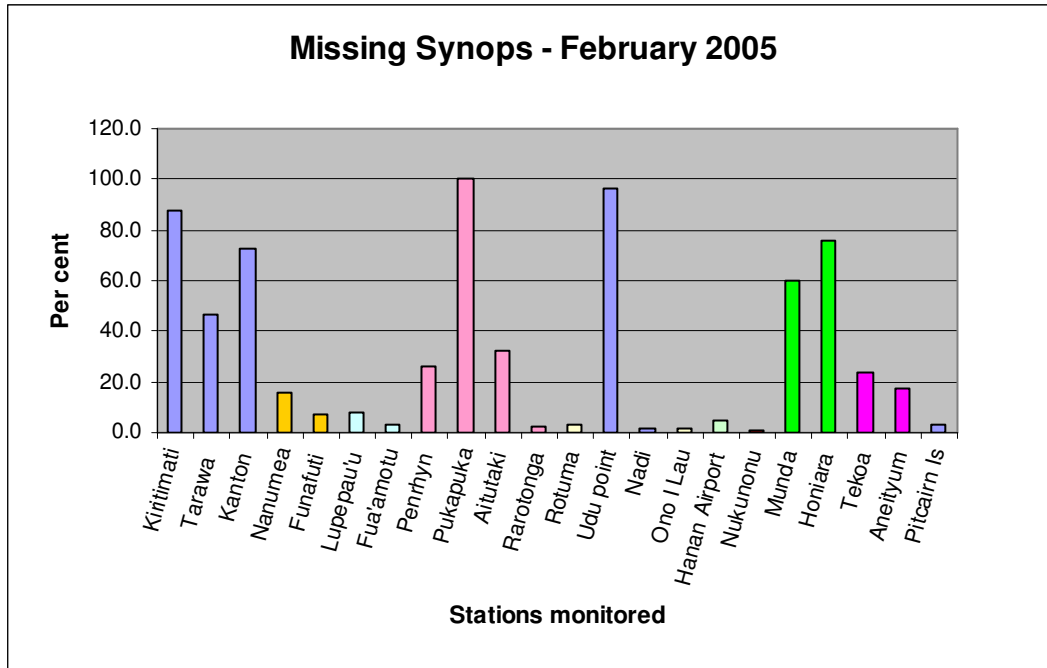
The chart shows the number of missing synoptic reports from the region's GSN stations that are passed through MetService's gateway or currently monitored by MetService. It does not take account of:

- Papua New Guinea stations.
- Reports that may have been received by the Meteorological Services' Head Offices but not on-forwarded to MetService.
- Reports that may have been rejected due to incorrect bulleting headers.

The total number of synoptic reports possible is determined from WMO Tables showing each stations reporting programme. Where it seems that the advised reporting programme is not up to date, as far as practicable, we will adjust total number of synoptic reports used in the calculation.

Stations are "colour coded" according to country. Please refer to Section 2.





5 Project activity

5.1 GUAN Routine Maintenance

No routine maintenance work was completed under the TSP provisions in Q3. The budgeted visits are scheduled for Tarawa and Funafuti in Q4. There is a requirement for a new PC for upper air data processing at Tarawa, and installing

and commissioning this will be completed during this visit. We will install the upper air software here in New Zealand together with software to enable it to send messages to communications PC. We are now planning to install a stand-alone laptop to handle communications. We are planning to install this in Q1 as part of the satellite / HF radio communications system.

5.2 GUAN Fault Maintenance

Following the failure of the power supply of the newly installed Proton at Funafuti, as reported last quarter, we sent the spare from the TSP kit. This was installed by the local technician but it again failed. We are aware that other Proton installations in other parts of the world are experiencing power supply problems. We have asked Proton Energies for more information. The TSP kit power supply unit was replaced by Proton Energies under warranty but we will not repair the Proton at Funafuti until we complete a scheduled visit in Q4 and can install a “under and over” voltage protection device in the power circuit. As the M28 has been left commissioned in case of any “teething” problems with the Proton, there are no issues of lost data as a result of this. We have had to supply some parts to keep the M28 serviceable but this is a better option than the extra cost of a fault visit and so preserves TSP funds.

As we are visiting both Tarawa and Funafuti in Q4 as part of the TSP Routine Maintenance provisions, we have further reduced the originally budgeted three Fault Maintenance visits from two to one. While remaining provisioned it seems unlikely that this visit will be needed.

With the Contact Monitor’s agreement (*email January 2005*), we have used part of the funds released from the cancellation of this second Fault Maintenance visit to undertake GUAN surveys at Port Moresby and Honiara. These were completed in Q3 (March) and while they will be the subject of separate reports, we will briefly comment here. The reports will be finalized and provided after the receipt of costs from Honiara and we have received the Digicora and completed an evaluation of it.

5.1.1 Port Moresby – Summary

This station is presently operating using a supply of radiosondes donated by the Bureau of Meteorology and 350gram balloons. This supply will be depleted in June 2005. The Director advises that he is budgeting for upper air consumables in the 2006 calendar year budget but it is an expensive item and may not be approved. Even if it was approved there would be a period of about nine months (July 2005 to March 2006) when the program would not operate without some additional support. As part of the assistance provided by the Bureau of Meteorology, it upgraded the Digicora for RS92 radiosondes.

The Teledyne hydrogen plant is unique in the region and is about ten years old, although it has only been installed for 5.5 years. It is not easily supported in the

region and is showing signs of deterioration in the tropical environment. The output is well down on specification – we suspect this has been caused by operating the system without filtered / demineralised water. Ideally it should be replaced with a Proton but it is operating and we believe this expenditure cannot be really justified at this stage. We will provide some demineraliser cartridges under the TSP provisions.

The balloon filling building remains the old building that was “fixed up” under the Balus Civil Aviation Restoration Program of 1999. The modifications are a little unorthodox in that one of the two balloon release doorways has been enclosed and the other is door-less. However, it seems to work. The new hydrogen building and the expansive technical building were abandoned partly finished in the mid 1990s when allocated funds were, we understand, reallocated by Civil Aviation for higher priority requirements. The meteorological service is no longer a part of the corporatised Civil Aviation Authority and is now a Government Department again. This seems likely to better ensure that its approved operating budgets will remain intact.

We assisted to restore the program after the PC and printer were stolen in a violent robbery during the night hours shortly before the visit. An old surplus PC was reconfigured and the TSP purchased a replacement printer. Four days were lost.

Remote assistance was provided to Tarawa and Funafuti on a number of occasions for communications faults.

5.1.2 Honiara – Summary

Our overarching comment is: “What a difference two years make”. This visit was delayed because of security issues. From the perilous state of the meteorological service only two years ago we believed that it would be necessary to consider a “green fields” approach to restoring the upper air programme. We were very pleasantly surprised to discover that the meteorological service headquarters and forecast office had been relocated from rented accommodation in Honiara to the Ministry’s building on a ridge immediately above the town and some 400 metres from the existing upper air building. The meteorological service was well equipped with forecasting tools and offices, and appeared to be very well supported by its parent Ministry. We encountered no security issues and experienced no concerns.

On inspection we found that the upper air facility required renovation and it seemed nothing had been done to it since the program last operated some six years earlier. The M28 hydrogen plant was located in a badly rusting shipping container outdoors and the Digicora was unserviceable. With the equipment we had available, we were unable to adequately evaluate the faults and have arranged for the Digicora to be sent to MetService for workshop evaluation. The M28 requires replacing although the tank could probably be reused. The surface instruments require replacing and a new printer and PC would be needed. Ideally, a dedicated satellite

communications system should be provided to minimize reliance on the local ISP for sending upper air messages by email. The building requires some renovation and the old chemical hydrogen generating room needs modifications to take a Proton plant. It would be too small for any plant of a similar size to the M28.

The balloon filling bay is small and could only accommodate 350 gram balloons. An option would be to raise the roof over this part of the building by about a metre to allow for 700 gram balloons to be used, and so obtain heights closer to the GCOS TRQ of 5 hPa.

We met with the Minister and Permanent Secretary and they were very supportive of any assistance to restore the program. Solomon Islands would be unable to afford its own consumables and may need assistance with electricity and communications costs associated with the upper air program. We also met with the Ministry of Finance Budgeting Unit and, we understood, next year's budget was approved and in place.

We completed the survey with a degree of confidence that if the upper air programme was restored and supported then it would operate well.

5.3 GUAN Ground Equipment consumables

We have ordered two thyratrons for the Penrhyn radar and a base adaptor to enable connection. We are manufacturing a special key that is required as a cheaper option to purchasing one from the manufacturer. We have also supplied a second hand spare thyatron from MetService's own stock. Delivery is twelve weeks and we will on-forward to Penrhyn as soon as they are received.

5.4 GUAN Technical Spares

The power supply unit from the Depot Spares kit was replaced by Proton during Q3. Freight associated with the shipment of these units was costed to the TSP. We replaced the ground equipment printer at Port Moresby while in-country – see Port Moresby report summary. This will be brought to charge in Q4.

5.5 GUAN Country Reimbursement

Only minor costs are accommodated and for the presently assisted stations all reasonable in-country operating costs are provisioned.

5.6 GSN Station Inspectors Kits

The GPS units and instructions were added to the three inspector's kits early in Q3.

5.7 GSN Stations Training Course

The final costs relating to accommodation and miscellaneous travel for the attendees of the one-day, Climate Data Management workshop that the TSP supported were brought to charge in Q3. We have further advised countries, on request, regarding setting up CLIREF software. However, the software is not easy to set up and we believe that the only way that it will be successfully commissioned in countries will be for a visit to do this.

The original TSP budget included a component for a training course of several days in New Zealand. To meet WMO's requirements to approve the project this was changed to provision additional Fault Maintenance visits. As the year progressed and these were not needed, together with other savings, we were able to include the Honiara and Port Moresby GUAN Station surveys and a one-day training course attached to a Regional Data Management workshop. The costs of the training course were budgeted at USD 35,000 and to date we have spent a little more than half that. We suggest that the TSP projected surplus be tentatively applied to establishing CLIREF in each of the countries that plan to use it. To date only Tuvalu is fully operating the system following Garry Clarke's work there last December.

5.8 GSN Stations Inspections

The kits have now been despatched to Niue, Tonga and Tuvalu as the first countries for the inspection of their GSN stations. Garry Clarke plans to be involved in this when he visits Niue for the RMSD meeting in early April and we are planning a demonstration to the Directors attending the RMSD meeting, should they wish.

Tonga has advised us of the in-country travel disbursements requirements and we are in the process of forwarding the money. Tuvalu expressed some concern that the meta-data would be made available to other organizations, for example NCDC. We have attempted to allay any concerns regarding this, explaining that data that is presently routinely sent from Tuvalu is stored in global databases and used for research. We think the concerns are based around ownership issues. We will review following the RMSD meeting and may write to TSP countries if it seems of general concern.

5.9 Reserves

There have been no requirements to date.

5.10 Programme management and administration

Work was in progress in Q3 to enable Tarawa and Funafuti to file upper air sounding, termination heights in our system, and to convert all those stations and

Penrhyn to filing termination heights in hPa. Work was also planned to add Port Moresby to the list. We are hopeful of commissioning this in Q4 but initial tests are showing an abnormal number of non-filings. While some of these are explained as non-receipt of messages (there are communication issues at both Tarawa and Funafuti at present), we are concerned that messages that may be incorrectly headed may be being rejected by our inwards messaging checks. We can manually intervene for any message that has not filed provided it is intercepted before the log file is overwritten after 24 hours. Operational staff are often too busy to manually check our SPAM box and a manual check by Garry Clarke can usually only occur when he is in the country.

Work is also in progress to extend monitoring of GSN stations to include the Papua New Guinea stations. We expect these to become available in Q4.

We have researched the meta-data system requirements and are starting the work involved. We had planned to complete this in Q3 but rather than write the software in an earlier version of Microsoft Access we decided to wait until the latest version was made available to MetService engineers early in Q4. This delay has no substantive effect on the Project outputs as the earliest that data would be entered would be on the return of the TSP kits.

Remote advice and assistance has been provided by Garry Clarke on the CLIREF software, as reported, but as has been the case for similar implementations, for example EMWIN, a training course as well as in-country assistance has been required to establish an operational programme in a country.

Work has been completed in Q3 resolving the logistics for the TSP managers' meeting planned for Q4 at Miami.

Routine programme control of activities, coordination, financial planning, management, reporting and administration was undertaken during the quarter.

6 Project Activity Planned for Next Quarter

- Complete Tarawa and Funafuti Routine Maintenance visits.
- Supply two thyratrons and ancillary equipment for Penrhyn.
- Receive back the TSP kits from Niue, Tonga and Tuvalu, recalibrate instruments, extract meta-data and enter in database, restock the kits and send to the next TSP countries.
- Complete the meta-data reporting system.
- Provide the Port Moresby and Honiara GUAN site survey reports.
- Attend the planned TSP managers meeting and present the TSP – Pacific perspectives.

7 Financials

Under separate cover to TSP stakeholders.

8 Report Distribution

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